HOW CAN PSYCHOLOGICAL CONTAGION EFFECT BE ATTENUATED? THE ROLE OF BOUNDARY EFFECT ON MENU DESIGN

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Psychological effects can be greatly influential for the foodservice industry, especially in menu design. Presenting dish pictures is a common practice on menus, but because of the psychological contagion effect, this practice could decrease consumers' evaluations of dishes, sometimes without the awareness of consumers, let alone restaurant managers. This research aims to explore the potential threats of a psychological contagion by considering how dishes that make consumers feel uncomfortable can affect their evaluations of dishes located nearby. It further examines how a psychological contagion can be attenuated when a visual boundary is placed between a discomfiting dish and a target dish. The results demonstrate the occurrence of psychological contagion in menu design. The interaction between psychological contagions and visual boundaries suggest that the psychological contagion can be attenuated through visual boundaries.

KEYWORDS: *menu design; menu psychology; psychological contagion effect; boundary effect*

INTRODUCTION

Contagion has been regarded as one of the biggest concerns for the foodservice industry (Eves & Dervisi, 2005; Tse, So, & Sin, 2006; Walczak, 1997; White, 1972). For example, when a consumer is dining in a restaurant, if a garbage man accidentally touches her, she may feel contaminated and uncomfortable. If the soup a consumer ordered is accidentally touched by a waiter's fingers, he may regard the soup as unclean. Even if two different dishes are put on the same plate, a feeling of contamination may be elicited. However, besides these physical contagion effects, psychological contagion effects can be generated in a restaurant scenario. Specifically, certain kinds of dishes on a restaurant menu may make some people feel uncomfortable (e.g., internal organs for some Westerners, blue cheese for some Easterners), and these dishes could induce a psychological contagion effect, contaminating and influencing a consumer's evaluation of a dish. Such an effect can also be induced by the proximity of two items and/or images on a menu. For example, if a Westerner dined in a Chinese restaurant, it is

possible that he would see Spicy Pork Lungs and Potato Salad (both are appetizers) displayed on the same page of the menu. Would the consumer like the Potato Salad more or less given its proximity to the Spicy Pork Lungs? Therefore, the current study aims to explore and investigate the psychological contagion effect caused by an uncomfortable food.

Psychological contagion effect is frequently experienced by consumers in food consumption contexts. Many top-selling food items, such as mayonnaise and baby food, are regarded as highly contaminative and uncomfortable to some people (Argo, Dahl, & Morales, 2006). In June 2011, CNN published an article asking their reporters to share the most revolting and uncomfortable food they have ever had. Century eggs, a very popular and common food that can be found almost everywhere in China, were listed at the top (CNN, 2011). Asian web users also rated smelly tofu as one of the most uncomfortable and bad-tasting foods, despite its being one of the most famous snacks in Asia (ifeng.com, 2013).

In this diversified age, more food items are listed on restaurant menus, often ones that are foreign to our born food habits. It is almost inevitable that a restaurant will offer dishes that make some people uncomfortable. So, will the uncomfortable feeling induced by these foods influence consumer evaluations of other dishes displayed nearby? If so, how can restaurant managers design menus to inhibit the uncomfortable feeling elicited by such foods? As the medium between diners and restaurant managers, menus are an effective advertising and communication tool for a restaurant. Therefore, menu research has long been recognized as an essential topic for the hospitality and restaurant industry (Kincaid & Corsun, 2003; Pavesic, 2005; Reynolds, Merritt, & Pinckney, 2005). With the consensus that menu can directly influence restaurant revenue, prior menu-related research has mainly focused on menu engineering, that is, the analysis to decide which items should be put, retained, or removed on the menu based on its sales performance (Chou & Fang, 2013; Kwong, 2005). Unfortunately, not very much attention has been paid to how menu design influences consumer's psychological perceptions and dish choices. The present research is an attempt to explore this lacuna by answering the questions posed above.

In sum, building on the contagion effect theory (e.g., Argo et al., 2006; Morales & Fitzsimons, 2007; Rozin & Fallon, 1987; Rozin & Nemeroff, 1990), this study first aims to use restaurant menu as experimental context to investigate the proposed psychological contagion effect. Second, this study aims to discover the circumstances under which psychological contagion effects are not salient. Lines, borders, frames, and confined areas are all visual boundaries that categorize and group elements. For example, separating two types of dishes on the restaurant menu using dashed lines is a common practice. Elements located within different boundaries are considered separate, and the mutual effect between these elements will be discouraged. Therefore, we further demonstrate that the psychological contagion effect can be attenuated if a visual boundary is set between the pictures of uncomfortable items and target items.

CONCEPTUAL BACKGROUND AND HYPOTHESES DEVELOPMENT

Contagion and Psychological Contagion Effect

Contagion effect happens when a consumer evaluates a product poorly because he perceives that the product has been contaminated by another negative source. Tse et al. (2006), taking the severe acute respiratory syndrome as an example, found that viruses (a potentially life-threatening example of physical contamination) would seriously prevent consumers from dining in the restaurants. In consumption contexts, even contamination effect

that is *not* life-threatening can affect consumer behavior. For instance, when consumers believe target products have come into contact with negatively evaluated individuals (Argo et al., 2006) or products (Morales & Fitzsimons, 2007), they feel uncomfortable about the potentially contaminated target product. Moreover, people react negatively and are unwilling to purchase products they assume have been touched by other individuals or products (Argo et al., 2006). This contagion effect is supported by the Law of Contagion, which proposes that when there is physical contact between a source (a person or an object) and a recipient (another person or another object), the negative properties of the source item will be transferred to the recipient, and thus the recipient is contaminated by the source. In other words, previous work has mainly focused on the contagion effect generated physically, and indicated that actual physical contact between persons or objects must take place for contagion effect to occur (Nemeroff & Rozin, 1994; Rozin & Fallon, 1987; Rozin & Nemeroff, 1990).

Apart from the physical contagion effect, another type of contagion effect would rather invisibly affect consumers' evaluations and behaviors, that is, the psychological contagion effect, which poses another potential threat for the industry. As food items and consumers' demands are becoming more diversified, restaurant managers are faced with pressure to be innovative, and meanwhile embrace new, strange, and foreign foods presented on the menus. Therefore, it is almost inevitable that a restaurant will offer dishes that make some people uncomfortable. Take sushi as an example, it is unacceptable for some Western consumers that raw fish is displayed on the top of sweet rice (Anthes, 2014).

Previous studies on picture effect have shown that pictures can elicit the feelings (e.g., Bradley, Cuthbert, & Lang, 1996), activate sensations (e.g., Krishna, Morrin, & Sayin, 2014), and affect judgments (e.g., Wyer, Hung, & Jiang, 2008). Thus, when consumers look at the pictures of uncomfortable foods on the menu, negative feelings will be produced and subsequent judgments will be influenced. Normally, consumers do not merely read one menu item and finish ordering, but will browse the menu items one by one, from left to right or from top to bottom. In this case, will the evaluations and feeling of one item influence the evaluations of the items read afterward? As the theory of feelings-as-information illustrate, people use feelings at hand as a source of information to make judgments of the products evaluated afterward (Schwarz, 2011). For example, people generally feel happier on sunny days than on rainy days, and thus when they are asked to report their life satisfactions, they will use their currently owned feeling to make feeling-congruent judgments. So people gave higher life satisfaction ratings on sunny days than on rainy days (Schwarz & Clore, 1983). As a study of emotion effect on economic decisions shows, when people were primed with a strong negative feeling, they would significantly lower their buying and selling prices, behaving in the way that they used the primed negative feelings as guidance to make decisions (Lerner, Small, & Loewenstein, 2004). Accordingly, consumers will use the feelings they have at hand as basis to give evaluations to the menu items.

If consumers receive negative feeling from the uncomfortable menu items, such as internal organs or sushi with raw fish, this negative feeling will be transferred to the menu items read afterward, which leads to the psychological contagion effect. However, very limited research has focused on this effect. A recent study has showed the potential existence of this psychological contagion effect indirectly. Argo and Main (2008) examined the contagion effect taking place among people in checkout lines: The coupon redemption behavior of one consumer would elicit a stigma (i.e., feelings of cheapness) and contaminate a noncoupon-redeeming individual located nearby. The feeling of cheapness was transferred to the shopper without redemption behavior, and consequently they were regarded as "cheap" as well. In other words, their study provides clues of the

psychological contagion effect (i.e., contagion without contact), where the shopper who redeems coupons is the negative source and the noncoupon-redeeming individual located nearby is the target. Accordingly, considering being near negatively evaluated and discomfiting objects could evoke feelings of contamination. Previous researches on contagion effect largely use real objects or individuals to test the effect, yet effects could be different between seeing the real foods and pictures of the foods (Hayashi & Ararei, 1963; Krishna et al., 2014). Therefore, different from priori research, our research uses visual pictures on the restaurant menus to test whether the proposed psychological contagion effect works among visual pictures.

Taken together, negative sources can therefore contaminate other objects/individuals not only through physical contact by transferring properties but also without any direct physical contact by transferring feelings. The present research therefore extends the contagion theory and proposes a psychological contagion effect; that is, a consumer may perceive a target product as being contaminated by a negative source product because of the negative feeling transference (e.g., feeling of dislike), which is reflected by the decreased evaluations of the target product. This evaluative process is automatic and unconscious. To examine this psychological contagion effect, we used restaurant menus as an experimental context, focusing specifically on the effect of nearby dishes on one another. A picture of a negatively evaluated menu item was treated as the source product, and a picture placed nearby the source product was regarded as the target product. In this context, we proposed the following hypothesis:

Hypothesis 1: Consumers will give a lower evaluation to a menu item displayed next to a picture of a negative source item than the one displayed next to a picture of a neutral source (control) item.

Boundary Effect

Given the possibility of psychological contamination by a negative source item, an intriguing question arises: What kind of situation would attenuate this psychological contagion effect in menu design? Arguably, setting a visual boundary between the negative source item and the nearby target items would help.

Lines, borders, frames, and confined areas are all boundaries that group and define items. For example, on a calendar or a timetable, when dates are separated by lines or grids, people consider the lines split the dates into two groups and the days belonging to different groups are regarded as independent (Myrseth & Fishbach, 2009). Visual perception research reveals that boundaries help our eyes understand what belongs together and what belongs in separate groups (Palmer & Rock, 1994). By nature, boundaries dictate belonging and tell viewers where to start and stop (Cutright, 2012), which in turn helps them process and focus on the elements in a defined space (Burris & Branscombe, 2005). Hence, elements located within different boundaries are considered separate, and the relationship between these items will be attenuated.

Accordingly, the psychological contagion effect will be impaired by the presence of boundary. On one hand, within the confined boundary, the mental stopping points give people a sense of psychological closure (e.g., Gu, Botti, & Faro, 2013), which signals the closeness of anything (including the feelings toward the elements) related to this boundary. Thus, the negative feeling elicited by the uncomfortable item is confined within its boundary. On the other hand, when the negative source item and target item are in the different boundaries, they are considered as independent and irrelevant. According to feelings-as-information, the impact of feeling on the subsequent judgment decreases when people perceive the judgment on hand is less relevant to the source of feeling (Pham, 1998; Schwarz, 2011). For instance, feeling gives less guidance when people use their feeling to decide for others

than for themselves because others are less relevant to them (Raghunathan & Pham, 1999). Consequently, feeling is less likely to be used as basis of judgment when item that induces feeling and item to be judged belong to different groups/boundaries. For instance, state borders separate and categorize different states. A study by Mishra and Mishra (2010) revealed that state borders have the ability to keep in-state disasters from contaminating states located nearby; in other words, individuals would underestimate the risks of a disaster which originated in a neighboring state. There is also evidence in marketing research of visual boundaries attenuating the psychological contagion effect. Argo and Main's (2008) coupon redemption study showed that when the coupon redeemer and the noncoupon redeemer stand in two separate checkout lines, the contagion effect on the second shopper (i.e., being regarded as cheap) is alleviated because he or she is located at a different boundary. This suggests that using boundaries can be an effective way to block the psychological contaminating effect elicited from a negative source object.

In the practice of menu design, placing elements in a confined area such as a box, separating two types of dishes using dashed lines, displaying items with different color backgrounds, or using package/cover to isolate foods can group items into different categories. The functional values of using boundaries are to group a specific kind of dish within a designated space—appetizers, for example—and to help consumers read them as one unit, and meanwhile to provide consumers with signals that items in different boundaries are isolated (Pavesic, 2005). The present research examines the ability of these boundaries to block the contaminating effect of a source menu item on a target item. In other words, we explore whether a visual boundary in a menu display can moderate the negative impact of the psychological contagion effect on a consumer's evaluation of a target menu item. Our second hypothesis follows:

Hypothesis 2: Consumers will give a lower evaluation to a menu item that is placed next to a negative source item in the same visual boundary than to the one that is separated from the negative source item by a visual boundary.

STUDY 1

Study 1 tests Hypotheses 1 and 2, which predicts that the negative source item will contaminate the target item displayed next to it, unless the psychological contagion effect is obstructed by a visual boundary between the negative source item and the target item.

Stimuli Selection

Strong odor is the characteristic of food which most likely cause discomfort in consumers, and meanwhile, many foods with a strong odor (e.g., Smelly Tofu) are popular and sold/consumed daily, suggesting that consumers are familiar with them. Moreover, neuroscience studies have shown that visual stimuli can evoke odor semantics (Grigor, Van Toller, Behan, & Richardson, 1999; Sarfarazi, Cave, Richardson, Behan, & Sedgwick, 1999); our nose can smell what our eyes see. An image of strong-smelling food is therefore likely to produce uncomfortable feelings in consumers even when they cannot physically smell the odor. For this reason, menus displaying foods with a strong odor are appropriate research stimuli for our study objectives. We suspect that the uncomfortable feeling generated by a picture of a strong-smelling food item may contaminate a neighboring food item on restaurant menus. For this study, Smelly Tofu, a famous snack with a strong odor, was selected as the

negative source item as it is rated as one of the most uncomfortable foods by Asian consumers (ifeng.com, 2013), and we compared the result of Smelly Tofu against that of Steamed Tofu (the neutral source or control item).

Additionally, according to the suggestions from Pavesic (2005) and researches of color perception and categorization (e.g., Franklin, Pilling, & Davies, 2005; Grossberg, 1984), people could identify the boundary contour especially when the colors are of high contrast. Therefore, in Study 1, we manipulated the boundary by changing background colors, putting the source and target item on the same- or different-colored backgrounds.

Pretests

Three pretests were conducted. Pretest 1 was conducted to determine the qualification of Smelly Tofu as the negative source item and Steamed Tofu as the control item. Forty undergraduate students (65% females; mean age = 21 years) from a university in Hong Kong participated in the study to determine a viable negative source item. The student sample was considered appropriate in the current study for the following reasons. First, undergraduate students are familiar with restaurant menus and dishes since they are real-life restaurant consumers. Second, undergraduate students represent a homogeneous group, which is suitable for theory testing (Calder, Phillips, & Tybout, 1981; Lynch, 1982). All participants were randomly assigned to one of the two conditions (negative source item: Smelly Tofu vs. control item: Steamed Tofu) and were shown a menu with a picture of either Smelly Tofu or Steamed Tofu. Participants then evaluated each dish on a 7-point Likert-type scale, responding to the following three statements: "I like this dish," "I want to order this dish," and "The dish seems to be delicious" (1 = *strongly disagree*, 7 = *strongly agree*; α = .96). Results from the pretest demonstrated that Smelly Tofu is a good representative of a negative source item. First, the responses for the aforementioned three questions were significantly different between the two conditions (*p*s < .05). Second, through averaging the results of the three questions, we found that the overall evaluation of Smelly Tofu was much lower than the neutral rating 4. In addition, compared with the control item (Steamed Tofu), the negative source item (Smelly Tofu) received a significantly lower evaluation ($M_{\text{Smelly Tofu}}$ = 3.00 vs. $M_{\text{Steamed Tofu}}$ = 4.43; $p < .01$). Finally, to test whether Smelly Tofu is, in fact, considered smelly, participants rated their agreement with the following statement: "The dish is smelly." Compared with Steamed Tofu, Smelly Tofu was rated more smelly ($M_{\text{Smelly Tofu}}$ = 5. 45 vs. $M_{\text{Steamed Tofu}}$ = 2. 80; $p < .001$). Hence, the manipulation was successful.

Pretest 2 was conducted to determine the qualification of three additional dishes (treated as either target dishes or fillers in the two main experiments, i.e., Cold Shredded Potatoes, Cold Lotus Root, and Poached Enoki Mushroom) as neutrally evaluated dishes. Forty undergraduate students (62% females; mean age = 21 years) from a university in Hong Kong were recruited. Participants were asked to evaluate the three dishes by evaluating three statements on a 7-point Likert-type scale: "I like this dish," "I want to order this dish," and "The dish seems to be delicious" (1 = *strongly disagree*, 7 = *strongly agree*). The evaluations of the three dishes were obtained by averaging the values of these three questions. The overall evaluations of all of the three dishes were around the neutral rating 4 ($M_{\text{Cold Shredded Potatoes}}$ = 4.06, $M_{\text{Cold Lotus Root}}$ = 4.00, and $M_{\text{Poached Enoki Mushroom}}$ = 4.28).

Pretest 3 was conducted to confirm effectiveness of using different background colors as manipulation of boundary effect. A total of 38 adult participants were recruited in the United States from Amazon Mechanical Turk, an online commercial panel. Respondents were volunteered to complete the survey in exchange for 20 cents. Among the 38 respondents, 63.2% are males, the mean age is 32 years, 44.8% are college graduates or

higher, 81.6% are Caucasian, and the majority have an annual household income between $25,000 and $75,000 (52.6%). Respondents were asked to complete four 7-point Likert-type scales (1 = *strongly disagree* to 7 = *strongly agree*) measuring the manipulation of boundary (e.g., "The different background colors [blue and orange] serves as the boundary between the dishes on the left ["Smelly Tofu" and "Cold Lotus Root"] and on the right ["Cold Shredded Potatoes" and "Poached Enoki Mushroom"]," "The dishes on the left and on the right items are separated by the different background colors [blue and orange]," "The different background colors [blue and orange] groups the dishes on the left and on the right into two different categories," and "The dishes on the left and on the right are independent because of the different background colors [blue and orange]." Cronbach's $\alpha = .78$). Through averaging the results of the four questions, we found that respondents agreed that the different background colors serves as the boundary ($M = 5.71$).

Participants and Study Design

One hundred undergraduate students from a university in Hong Kong (69% females; mean age = 20 years) participated in Study 1. In this study, the negative source item was Smelly Tofu, the control item was steamed Tofu, and the target item was Cold Shredded Potatoes. A 2 (source item: negative source item vs. control item) × 2 (boundary between source item and target item: boundary effect vs. no boundary effect) between-subject experimental design was used. Participants were invited to do a menu-testing study, and each of them received HK$30 for their participation. In order to examine the psychological contagion effect elicited by the negative source item (Smelly Tofu) on the target item (Cold Shredded Potatoes) and the boundary effect, participants were randomly assigned to one of the four conditions.

To make the menu more natural and to manipulate the boundary effect, a total of four items were put on the menu. The item at the top left corner was the source item (either Smelly Tofu or Steamed Tofu), and the target item at the top right corner was Cold Shredded Potatoes, which participants were asked to evaluate. The remaining two items were fillers, placed under the source and the target items. Based on the results of the second pretest, the filler items were neutrally evaluated and would therefore have minimal effect on the source and target items. Additionally, on the basis of the Pretest 3, we manipulated the boundary by changing background colors. Specifically, in the boundary effect condition, the source item and the target item were in different colored zones, whereas in the no boundary effect condition, the source item and the target item were in the same colored zone (see Appendix A, for the menus).

Procedure

Participants were told that the aim of the study was to help a restaurant test its new menu. A paper menu, as shown in the Appendix A, was first distributed to each participant, and then they were asked to imagine they were holding the menu and ordering the items. After they formed an impression of the four items on the menu, they were asked to evaluate each item according to the following sequence: (1) source item (Smelly Tofu or Steamed Tofu), (2) Cold Shredded Potatoes, (3) Cold Lotus Root, (4) Poached Enoki Mushroom. They performed this evaluation by responding to the following three statements on a 7-point Likert-type scale: "I like this dish," "I want to order this dish," "The dish seems to be delicious" (1 = *strongly disagree*, 7 = *strongly agree*; $\alpha = .96$). The reason for assigning the evaluative sequence was to ensure that participants first looked at the source item and then

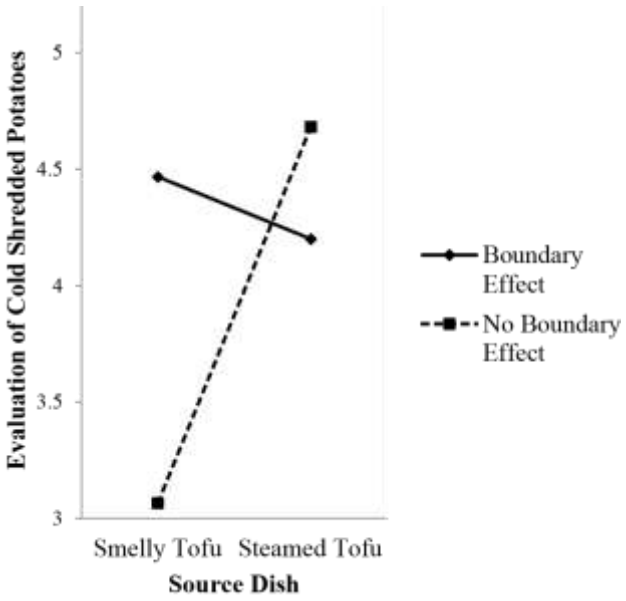
the target item. Otherwise, the psychological contagion effect could not be appropriately measured. At the end of the experiment, participants were asked to provide their demographic information.

Manipulation Checks

As expected, the results showed a significant difference between evaluations of the negative source item (Smelly Tofu) and the control item (Steamed Tofu; $M_{\text{Smelly Tofu}} = 3.23$ vs. $M_{\text{Steamed Tofu}} = 4.12$; $t(98) = -2.72$, $p < .01$). The results from the manipulation checks suggest that the manipulations were effective.

Figure 1

Interaction Effect of Source Dish and Boundary on Cold Shredded Potatoes



Results

Hypothesis 1 suggests that after looking at the negative source item (Smelly Tofu), consumers will have a feeling of dislike, which is reflected by a lower evaluation of the item displayed nearby (Cold Shredded Potatoes) than those who first look at the control item (Steamed Tofu). The results demonstrated the main effect of the source item was significant, $F(1, 55) = 4.32$, $p < .05$, indicating that when consumers first looked at the negative source item (Smelly Tofu), they gave lower evaluations to the item displayed next to it ($M_{\text{Cold Shredded Potatoes}} = 3.49$) than those who first looked at the control item (Steamed Tofu; $M_{\text{Cold Shredded Potatoes}} = 4.81$). Therefore, Hypothesis 1 is supported. More important, the results indicated a significant interaction between the source item (Smelly Tofu/Steamed Tofu) and boundary effects when consumers evaluated the target item (Cold Shredded Potatoes; $F(1, 96) = 9.27$, $p < .01$). In the boundary effect condition, where the contagion effect was hindered by the boundary effect, evaluations of Cold Shredded

Potatoes did not significantly differ between the two stimuli conditions (4.47 vs. 4.20; $p > .10$). On the other hand, when the boundary effect was absent—that is, the source item and the target item (Cold Shredded Potatoes) were grouped together—the target item was contaminated by the negative source item, and the evaluation of the target item was significantly lower in the negative source item condition (Smelly Tofu) than in the control item condition (Steamed Tofu; 3.07 vs. 4.68; $p < .001$). The results indicate that a visual boundary on menu displays can attenuate the negative impact of the psychological contagion effect. Hence, Hypothesis 2 is supported. See Figure 1, for the means.

Follow-Up Study

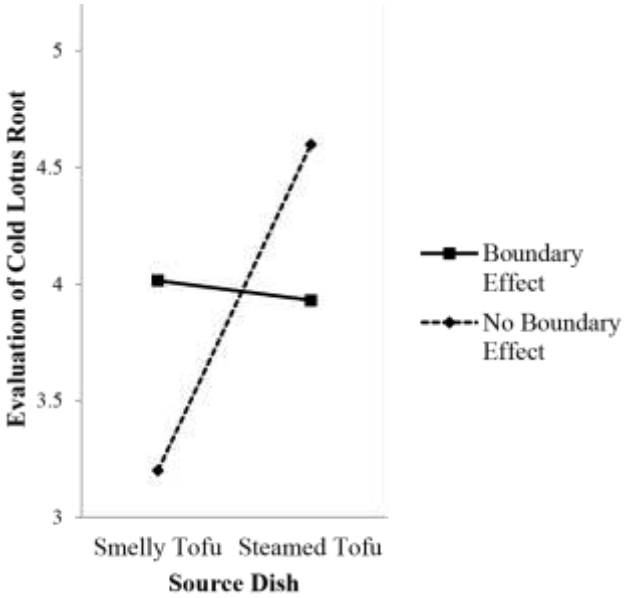
Our objectives of including the follow-up study are to replicate the findings of Study 1 and to demonstrate the generalizability of the psychological contagion effect (regardless of the relative location of the source item and target item). The experimental design of follow-up study was identical to Study 1, except that follow-up study was conducted with a new target item, which was placed at a different direction of the source item: Cold Lotus Root (underneath the source item) replaced Cold Shredded Potatoes (on the right side of the source item).

Participants in follow-up study were asked to evaluate the menu dishes in a vertical order (i.e., an inverted-N shape) so that Cold Lotus Root was evaluated immediately after the source item, and was therefore analyzed as target item. As long as the target item is within the same distance of the source item, no matter the direction, it can be perceived as contaminated by the negative source item, and the psychological contagion effect should lower consumers' evaluations of it. Nighty-seven undergraduate students from a university in Hong Kong (75.3% females; mean age = 21 years) participated in follow-up study. A 2 (source item: negative source item: Smelly Tofu vs. control item: Steamed Tofu) × 2 (boundary between target item and source item: boundary effect vs. no boundary effect) between-subject experimental design was conducted. The menu design in follow-up study was identical to Study 1, but the target item was changed from Cold Shredded Potatoes to Cold Lotus Root. The manipulation of the visual boundary was also identical. In the no boundary effect condition, the source item and the target item (Cold Lotus Root) are in the same boundary, whereas in the boundary effect condition, the source item and the target item (Cold Lotus Root) are in different boundaries.

Consistent with the findings from Study 1, the results revealed that manipulating the source item significantly alters the psychological contagion effect, $F(1, 56) = 5.86$, $p < .05$. When participants first looked at the negative source item, Smelly Tofu, they were more likely to devaluate the Cold Lotus Root ($M_{\text{Cold Lotus Root}} = 3.07$) than those who first looked at the control item, Steamed Tofu ($M_{\text{Cold Lotus Root}} = 4.53$). Therefore, Hypothesis 1 is supported. In addition, a 2 × 2 analysis of variance indicated a significant interaction between the source item (Smelly Tofu/Steamed Tofu) and boundary effects when consumers evaluated the target item (Cold Lotus Root), $F(1, 93) = 6.68$, $p < .05$. In the boundary effect condition, where the visual boundary blocked the psychological contagion effect, the evaluation of Cold Lotus Root did not significantly differ between the two different stimuli conditions (4.01 vs. 3.93;

Figure 2

Interaction Effect of Source Dish and Boundary on Cold Lotus Root



$p > .10$). In the no boundary effect condition, where the source item and the target item (Cold Lotus Root) were grouped together, the evaluation of the target item was significant lower in the negative source item condition (Smelly Tofu) than in the control item condition (Steamed Tofu; 3.20 vs. 4.60; $p = .001$). Again, Hypothesis 2 is supported. See Figure 2, for the means.

STUDY 2

Besides menu layout (e.g., different background colors used in previous studies), product packages could serve as boundary as well. Accordingly, Study 2 was conducted by using a type of product package, transparent plastic covers, as surrogate of boundary to extend the boundary effect. Moreover, to demonstrate the general applicability of the psychological contagion effect, a different food type, sushi, and nonstudents samples were used.

Pretests

Two pretests were conducted. In Study 2, we used Octopus sushi as the negative source item and Sweet Egg Roll as the neutrally evaluated target item. Hence, the first pretest was conducted to determine the qualification of Octopus sushi and Sweet Egg Roll. Eighty participants (65% males; mean age = 32 years; 48.8% college graduates or higher; 76.3% Caucasian; 60% have an annual household income between $25,000 and $75,000) were recruited from MTurk, and they were randomly assigned to either a negative source condition (Octopus sushi, $N = 38$) or a target condition (Sweet Egg Roll, $N = 42$). The procedures and measurements (1 = *strongly disagree*, 7 = *strongly agree*; $\alpha = .98$) were identical to the first and second pretest of Study 1. Results showed that the evaluation of Octopus sushi was much lower than the neutral rating 4 ($M_{\text{Octopus}} = 3.19$), and the evaluation of Sweet Egg Roll was around the neutral rating 4 ($M_{\text{Sweet Egg Roll}} = 4.19$).

Therefore, Octopus sushi is a good representative of a negative source item, and Sweet Egg Roll is qualified as the target item.

The second pretest demonstrated the effectiveness of using transparent plastic cover over sushi as the boundary manipulation. Another group of 42 Mturk participants (64.3% males; mean age = 35 years; 52.3% college graduates or higher; 73.8% Caucasian; 66.7% have an annual household income between $25,000 and $75,000) were recruited. Participants were asked to rate their agreement with the four questions: the transparent plastic film serves as the boundary between the two sushi items; the two sushi items are separated by the transparent plastic film; the transparent plastic film groups the two sushi items into two different categories; the two sushi items are independent because of the transparent plastic film (1 = *strongly disagree*, 7 = *strongly agree*; α = .80). As expected, results showed that respondents agreed that transparent plastic cover serves as the boundary (M = 5.52).

Participants and Study Design

The main objective of Study 2 was to extend the boundary effect, and thus a 2 (boundary between target item and source item: boundary effect vs. no boundary effect) between-subject experimental design was used to test Hypothesis 2. A total of 84 adult participants were recruited in the United States from Mturk. The 84 respondents (65.5% males; mean age = 30 years; 50% college graduates or higher; 64.3% Caucasian; 66.7% had an annual household income between $15,000 and $75,000) were randomly assigned to one of the two menu conditions. All participants were first asked to imagine themselves as the customer of this sushi restaurant and read the menu (see Appendix B for the menus) from left to right (i.e., from the negative source item to the target item). After they formed an impression of the menu, they were asked to evaluate each item by responding to the following three statements on a 7-point Likert-type scale: "I like this item," "I want to order this item," "The item seems to be delicious" (1 = *strongly disagree*, 7 = *strongly agree*; α = .95).

Results

First, two manipulation checks were conducted. Results confirmed that Octopus sushi was a good representative of negative source item (M = 3.19, N = 84). Moreover, by using the same measurements of boundary effect as the pretest, transparent plastic covers were agreed to be a boundary (M = 5.42, N = 41). Therefore, the manipulation of negative source and boundary effect were both effective.

Second, an independent sample t test was conducted to test Hypothesis 2—that boundary could hinder the psychological contagion effect. The analysis supported the prediction and revealed a significant main effect of boundary (p < .01). Specifically, when boundary was present (i.e., a transparent plastic cover wrapped the Octopus sushi), feeling of dislike was blocked by the boundary, and the evaluation of the target item was significant higher than when the boundary was absent (4.17 vs. 3.34). Hence, Study 2 utilized another strategy, using product packages as boundary, to supported Hypothesis 2.

CONCLUSION

Summary and Discussion

Prior research has focused on the physical contagion effect. This research instead investigated the potential threats of the *psychological* contagion effect by investigating an important question for menu design: How does

the visual presentation of different dishes on a menu influence consumer evaluations? Extending the traditional contagion effect theory, a psychological contagion effect was proposed; that is, we proposed that a negative source item could contaminate an adjacent object even if there was no physical contact between them. In the context of menu design, this study proposed that a picture of a discomfiting dish (the negative source) could contaminate an adjacent dish on a menu. This study also examined the effect of boundaries on menu design, concluding that the psychological contagion effect can be attenuated if a boundary separates the negative source item and the target item. Results confirm these arguments. Participants gave a lower evaluation to a menu item if its picture was adjacent to a picture of Smelly Tofu (i.e., negative source item) as versus Steamed Tofu (i.e., control item). However, these differences in evaluation disappeared when a visual boundary separated the pictures of the negative source item and the target item.

Implications

Prior menu research has largely focused on how to deliver menu engineering to maximize the profits of each menu item (e.g., Raab & Mayer, 2007; Reynolds & Taylor, 2011). Relatively few studies have taken the perspective of menu psychology to examine the psychological influence of menu design on consumer behaviors. However, in this highly competitive restaurant business, other than knowing restaurants' sales performance, standing in consumers' shoes to understand what leads to their choice and behavior is an irreversible trend for industry practitioners.

Even though contagion (both physical and psychological contagion) occurs very frequently in the day-to-day restaurant operations, majority of past researches on contagion focused on retailing context. Indeed, researches on contagion effect warrant more attention from hospitality industry. To the best of our knowledge, this research is the first piece in hospitality industry to employing the psychological contagion effect in the day-to-day operation context. The findings make an original contribution and emphasize the importance of recognizing the potential threats of physical and psychological contagion effects. Moreover, this study examined the type of boundary which is commonly observed but under researched. According to the classification of boundary proposed by Cutright (2012), boundaries could be tangible and intangible. Tangible boundary is the visual border, such as frame around a painting, which is the type of boundary used in this research. Although setting tangible boundaries is a common practice in everyday life, very few researchers have examined such boundaries (Cutright, 2012). Meanwhile, most boundary researches examined the tangible ones, which provide a sense of belonging and differentiation. For example, the research conducted by Cutright (2012) refers to intangible boundaries with respect to personal control, arguing that consumers prefer bounded objects when their personal control is threatened. This study examines the boundary effects using underresearched tangible boundaries, and identifies a condition under which psychological contagion effects arises but not contaminate other items in menu design.

The demonstrated psychological contagion effect provides critical insight for menu designers. Foodservice practitioners have recognized the importance of appropriate menu design, and have summarized what should be avoided when writing restaurant menus. For example, practitioners advise against the use of clip art and technical terms (Mealey, 2013). However, the more obscure psychological factors driving consumers' evaluations cannot be easily observed by foodservice practitioners, and are therefore less easily resolved. This research reveals the impact of psychological contagions on menu items. Some negative source dishes can contaminate normal dishes

located nearby. These findings demonstrate the importance of using smart strategies to separate menu items, so that the possibility of psychological contagion could be alleviated.

Moreover, the psychological contagion effect is not confined to dish pictures. It can also apply to other illustrations or decorative pictures. Some menus, for example, include figures or photos of raw materials, and these images should be cautiously selected and displayed. For example, many Asian restaurants use pictures of raw materials to illustrate the contents and quality of a dish, but when a slab of bloody pork is placed beside a cooked and plated meal, the former is likely to decrease the attractiveness of the latter. In another case, beverage cups may be decorated with a restaurant logo or food specialty—roast beef or a cow at a BBQ restaurant. This image on a beverage cup may make a serving of orange juice less tasty.

The boundary effect can also be essential to restaurant management. For instance, if all of the menu items are accompanied by pictures, to maintain consistency the polarizing dishes and their pictures can be separated from normal items by visual boundaries. Moreover, this research revealed and examined the effectiveness of different approaches to produce boundary effect. To elicit boundary effect, the restaurant managers could adopt strategies more than menu layout, such as using boxes or frames, inserting dividing lines between different food categories, and so forth. The ingenious product designs could also lead to boundary effect. Just as the boundary manipulation method used in Study 2, the product package was proved to produce boundary effect. Finally, boundary effects are not limited to the menu design; they can be applied to the design of other restaurant marketing materials, such as advertisements, promotion leaflets, and even coupons.

Limitations and Future Research

The current study is a first step toward understanding the role of psychological contagions in the hospitality industry. Several limitations offer many opportunities for future investigation. First, this research proved the existence of the psychological contagion effect, showing that a negative source item can decrease a consumer's evaluation of items located nearby through transferring the negative feeling. The feeling in this research is a general feeling of dislike, which is reflected by the decreasing evaluations. Further research could consider testing some specific feelings or sensory feelings, such as feeling of disgust and taste of sweet. As more and more strange foods are considered to be in our ingredients list, some extremely negative feelings, such as disgusting, could be elicited in restaurants. For example, some proposed we could turn to bugs for protein and nutrition (Kraft, 2014). If insects are really listed in restaurant menus, will the feeling of disgust be transferred to other normal dishes located nearby? Moreover, according to the study of sensory marketing (e.g., Krishna, 2012; Krishna & Schwarz, 2014), different senses (e.g., taste) are related with emotions/feelings, and thus, is it possible that the sweetness of a chocolate cake can increase the perceived sweetness of other food located nearby?

Second, it would be interesting for the future research to explore other strategies to minimize the psychological contagion effect in menu design, besides using boundary. The strategies could be changing menu layout, such as including visual boundaries, customizing product packages by adding a transparent cover, or providing independent menus. Some special and unique dishes, like Smelly Tofu, which are polarizing, could be isolated and/or displayed on a separate menu. Independent menus are commonly provided on special holidays, like Valentine's Day, but the possibility of splitting menus to avoid psychological contagion warrants more attention.

Third, boundary effect should be used with caution, in which the boundary is not only able to block the transference of negative effect but may hinder the positive effect. For instance, if a restaurant wants to sell several

dishes as a set or tries to promote a newly launched item alongside some popular dishes, the visual boundaries might impair the bundle-selling strategy, and thus the restaurant ought to avoid using visual boundaries between dishes on marketing materials. Hence, future research could explore the interference effect of boundary.

More future research may examine the effects of positive psychological contagion. Previous research on positive physical contagion has found that positive contagion only occurs through symbolic interaction model if the contagion source has a strong positive association for or relationship with the recipient. For example, consumers would more positively evaluate a product if the product has been touched by individuals the consumer finds attractive or admires (e.g., Argo, Dahl, & Morales, 2008; Newman, Diesendruck, & Bloom, 2011). Thus, the situations in which positive contagion would occur are distinct from negative contagion. It might be worth exploring whether a menu featuring the image of a dish eaten and recommended by a movie star would affect consumer evaluations of adjacent items. Will the adjacent items receive higher evaluations? If a dish is held by a beautiful young lady on a menu, will the evaluations of nearby menu items increase? Future research could investigate these questions to gain a greater understanding of the psychological contagion effect.

Finally, respondents were asked to imagine that they were ordering from a provided menu with an assigned evaluative sequence. Consequently, we measured consumers' evaluations for theory testing instead of their real consumption behavior. Future research may consider a field study that captures real purchasing behavior.

APPENDIX A

Sample Menus for Study 1		Sample Menus for Follow-Up Study	
(A) The menu of negative source item and Cold Shredded Potatoes as target item in boundary condition		(E) The menu of negative source item and Cold Lotus Root as target item in no boundary condition	
(B) The menu of negative source item and Cold Shredded Potatoes as target item in no boundary condition		(F) The menu of negative source item and Cold Lotus Root as target item in boundary condition	
(C) The menu of control item and Cold Shredded Potatoes as target item in boundary condition		(G) The menu of control item and Cold Lotus Root as target item in no boundary condition	

(D) The menu of control item and Cold Shredded Potatoes as target item in no boundary condition

(H) The menu of control item and Cold Lotus Root as target item in boundary condition

APPENDIX B

Sample Menus for Study 2

(I) The menu of negative source item (Octopus) and target item (Sweet Egg Roll) in boundary condition

(J) The menu of negative source item (Octopus) and target item (Sweet Egg Roll) in no boundary condition

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